National Aeronautics and
Space Administration

technology solution

Instrumentation

Robotic Inspection System for Deep Sea Structures

Surveys interior volume, interrogates structure integrity, and displays real-time video and sonar

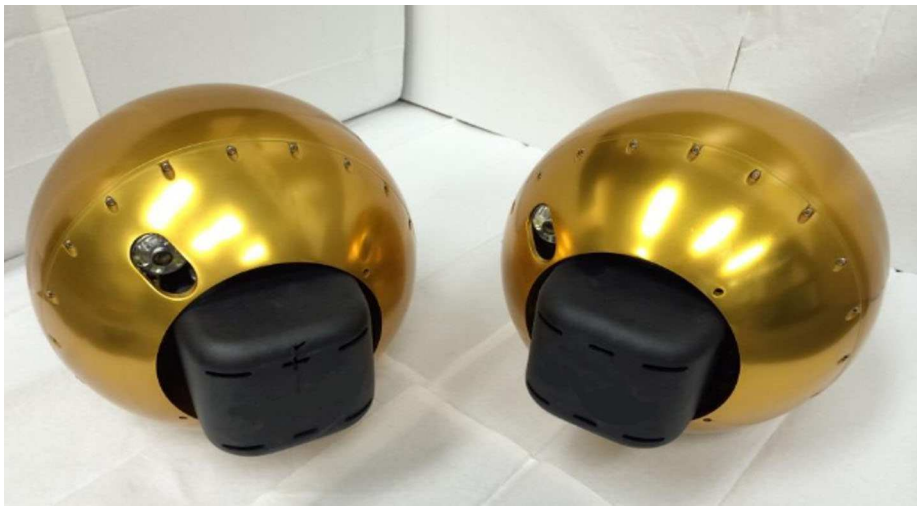
NASA Johnson Space Center innovators have designed a Robotic Inspection System that is capable of surveying deep sea structures such as oil platform storage cells/tanks and pipelines in order to determine the volume of material remaining inside, interrogate structure integrity, and display real-time video and sonar. This inspection device and method could significantly reduce the cost of inspecting and in the future, provide sampling of the structure contents. The technology is an all-in-one inspection device that includes cameras, sonar and motion sensing instruments with hardware and software components. This NASA-developed technology is available for licensing.

BENEFITS

- Sonar display: 3-dimensional range data from 2-dimensional information
- All-in-one inspection device: cameras, sonar, and motion sensing instruments
- Minimal moving parts

THE TECHNOLOGY

The Robotic Inspection System improves the inspection of deep sea structures such as offshore storage cells/tanks, pipelines, and other subsea exploration applications. Generally, oil platforms are comprised of pipelines and/or subsea storage cells. These storage cells not only provide a stable base for the platform, they provide intermediate storage and separation capability for oil. Surveying these structures to examine the contents is often required when the platforms are being decommissioned. The Robotic Inspection System provides a device and method for imaging the inside of the cells, which includes hardware and software components. The device is able to move through interconnected pipes, even making 90 degree turns with minimal power. The Robotic Inspection System is able to display 3-dimentional range data from 2-dimensional information. This inspection method and device could significantly reduce the cost of decommissioning cells. The device has the capability to map interior volume, interrogate integrity of cell fill lines, display real-time video and sonar, and with future development possibly sample sediment or oil.



Robotic inspection device prototype used for testing.

APPLICATIONS

The technology has several potential applications:

- Sub-sea oil and gas platform structures
- Deep sea exploration
- Pipelines at least partially containing a fluid

PUBLICATIONS

Patent Pending

More Information

National Aeronautics and Space Administration

Michelles P. Lewis

Johnson Space Center

2101 NASA Parkway
Houston, TX 77058
281.483.3809
jsc-techtran@mail.nasa.gov

http://technology.nasa.gov/

www.nasa.gov

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